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TARSONEMID MITES (ACARINA: PROSTIGMATA) FROM TAIWAN

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ABSTRACT

Among the thirteen species of mites belonging to family Tarsonemidae described in this paper, two new genera: *Cheylotarsonemus* and *Neosteneotarsonemus* were recognized and described, and six species: *Tarsonemus wani*, *Xenotarsonemus rivalis*, *Steneotarsonemus chiaoi*, *S. pulchellus*, *Cheylotarsonemus minutus*, and *Neosteneotarsonemus mirabilis* were new and described here for the first time. Four previously described species from elsewhere, *Tarsonemus smithi*, *T. gramineus*, *Steneotarsonemus furcatus*, and *Fungitarsonemus boringuensis* were new records for Taiwan.

INTRODUCTION

Mites belonging to family Tarsonemidae have been observed in Taiwan. They can be found on living plants, tree barks, stored food product, and in humus. Lo (1972) and Tseng (1974) had already described three species: *Tarsonemus floricolus*, *Steneotarsonemus spinki*, and *Polyphagotarsonemus latus*. Here we describe these three species as well as six others including two new genera found recently in a survey.

Although the nomenclature for leg setation by Suski (1966 and 1968), Lindquist (1967, 1970), and Mahunka (1970) shows merit in certain genera, in this paper we do not make effort to apply names or symbols or adapt leg chaetotaxy nomenclature proposed by these authors, rather we adapt leg IV of male and female as defined by Ewing (1939) for part of the description presented here. For part of the nomenclature used to describe dorsum are those adapted from Lindquist (1969) while others are author's concepts.

MATERIAL AND METHODS

The mites examined in this study were collected from several sources: living plants, humus, stored food products, and tree barks. Different methods, such as direct observation of mites on leaf surface by hand lens or a binocular microscope, brushing or beating method or modified Berlese funnel method, were used to collect the mite specimen. All mites prepared for microscopic study were mounted in Hoyer's solution as modified by Schuster and Pritchard (1963). This solution consisted of 50ml distilled water, 50 g gum arabic, 300 g chloralhydrate, 20 g glycerin, 1 g potassium iodide and 2 g iodine. The covered mounts were gently heated to allow all legs stretch naturally and examined under a high power microscope.

MORPHOLOGY

Tarsonemids are very small, ranging

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in length about from 100 to 300μ, with an oval or elongated body clearly divided into propodosoma and hysterosoma, the latter showing distinct traces of segmentation. Female and male is dissimilar in size.

Capitulum in some species do not project beyong outline of idiosoma. The base of chelicerae are enclosed in cheliceral sheath lying close together each terminating in a stylet-shaped structure. A tube surrounds the cheliceral sheaths, whose floor and lateral wall are formed by fused bases of pedipalps. A pair of stout palp bear two or three indistinct segmentation inserted on the apical portion of capitulum.

The propodosoma may overlap the capitulum. In female propodosoma bears 2 pairs of dorsal propodosomal setae, anterior pair is vertical and, posterior pair, the scapular setae, sometimes bear a pair of clavate pseudostigmatic organs of various shapes which arise from cup-shaped pits. Hysterosoma often shows clear traces of segmentation on its dorsal and lateral surface, with 2 pairs of lateral setae and 4 pairs of dorsocentral setae (D). Stigmatal or tracheal openning are quite distinct, being situated dorsolaterally near the anterior margin of propodosoma at the base of capitulum and communicates with a pair of tracheal tubes which run towards the posterior end of the body. The trachea in some species connect with paired, heavily sclerotized structure situated medially near the point of apodemes II and anterior median apodeme. Ventral apodeme well-developed, apodeme I always converging with anterior median apodeme, apodeme II longer than apodeme of leg I which is jointed or not convering with anterior median apodeme. Anterior median apodeme forms a Y-Shaped structure anteriorally. Transverse apodeme in some species are absent. Apodeme III and VI are distinct and stout. Posterior median apodeme bears 4 pairs of ventral setae, first pair arising from behind or on the apodeme s I, second pair situated on the apodemes II, third pairs arises from above of the apodeme III, and fourth pair located on the fourth apodemal plates. The legs have five free segments, the coxa being incorporated into the ventral body wall and in anterior edge thickened to form a apodeme. The coxal plates of legs I and II are usually remote from III and IV. Tarsus I with solenidion, pretarsus in a single claw, tarsus II winh solenidion, pretarsi II and III in two claws; leg IV slender, smaller than those of legs I to III. Segment in leg IV can be divided into four: coxa, trochanter, segment III and segment IV. On coxa and trochanter setae are absent. The third segment has 2 pairs of setae, basal setae located near the base, subapical setae situated at the terminal end. The fourth segment has 2 pairs of rather long and about setae, subapical setae shorter than the apical setae which is whip like.

In males the body is oval, propodosoma with 4 pairs of propodosomal setae and no pseudostigmatic organ. Hysterosoma with 2 pairs of lateral setae and 2 pairs of dorsocentral setae. Ventral side is similar to that of female. Leg IV thickened and curved inwards towards the midline, forming a pincer-like structure with corresponding tarsus of the other side. Leg IV is four segmented. Coxa bears a single pair of setae. Femur bears three pairs of femoral setae with proximal setae arising from the anterior inner region, inner distal setae sometime strong and long, and outer distal setae located on the dorsal side of this segment. In some species inner margin produces to form a flanglike expansion. Tibia with a pair of setae, tactile seta long and whip-like, a clavate setae located in front of tactile setae. Tarsus bears 2 pairs of tarsal setae. In some tarsonemid species, tibia and tarsus are fused into a tibiotarsus segment. The papilla is situated terminally on the opistho-

soma.

BIONOMICS

Many factors interact to affect the abundance of tarsonemid mites. (1) Features of life cycle, particularly with regard to movement phase, reproductive potential, and diapause. All tarsonemid mites thus far studied have four distinct stages, egg hatches into six-legged larva, from this active larval stage the mites of both sex enter a quiscent "pupal" stage in which transformation to the adult take place (2) The nutrition afford by the host plant, and its relation susceptibility or resistance to the mites (3) Meteorological condition, including photoperiod effects; (4) Action of enemies, particularly the predators and (5) The horticultural programs in their entirely, including use of chemicals.

The importance of tarsonemid to agriculture has long been established. The importance of this group in the fields of public health and medical acarology is a matter of record. Many of species of mites in this family probably feed on fungi or possibly algae. Because of chelicerae are simple, styliform and are only slightly eversible, such feeding appendage are quite suitable for penetrating thin-walled mycelial strands and highly succulent tissue. They are, however, quite incapable of penetrating thick-walled, lignified and often varnished tissue such as are found in mature stems and leaves. Occassionally toxin injected during feeding, presumably of salivary gland, causes alternation of normal tissue ontogeny in the host plant. In at least some cases continuous proliferation of thin-walled cells in a localized area around the feeding site on mature leaves produce material available to the mite for food. Often this type of deformity begins when the leaf is proximal to the apical meristem a time when its epidermal cell walls are thin and vulnerable to attack. Species that are known to be able to feed successfully on leaves, probably by virtue of their ability to produce such toxemia, are *Steneotarsonemus pallidus* (Banks) and *Polyphagotarsonemus latus* (Banks).

TAXONOMY

Tarsonemus Canestrini and Fanzago, 1876, Atti Soc. Venete-Trentina Sci. Nat. Padova. vol, 5:142
Genotype: *Chironemus minusculus* Canestrini and Fanzago (by original designation)

Chironemus Canestrini and Fanzago (not Cuvier 1820. Pisces), 1876, Atti. Soc. Veneto-Tretina Sci. Nat. Padova, vol. 5:110.
Monotypic genotype: *Chironemus minusclus* C. & F.

Dendroptus Kramer, 1876, Arch. fur Naturgesch, vol. 42:28
Genotype: *Dendroptus kirchneri* Kramer (by original designation)

Cheylurus Trouessart, 1884, Bull. Soc. Etude Sci. d'angers. vol. 14:90
Genotype: *Cheylurus socialis* Trouessart (by original designation)

This genus is characterized by a subcordate capitulum with palpi never prolonged to form snoutlike beak. The male with fourth pair of propodosomal seta is lateral to the third dorsal propodosomal seta, the inner margins of femora IV are generally simple and are not produced into either a flangelike enlargement or a spurlike process. Tarsus IV always with a terminal claw. First pair of ventral propodosomal setae never in front of apodeme I. This genus is composed of fungus or alga feeders showning little host preference.

1. *Tarsonemus smithi* EWING
(Figs. 1-2)

Tarsonemus smithi Ewing; 1909. U.S. Dept. Agr Tech. Bull. 653:18
Type host: *Rubus occidentalis* (Common blackcap)
Type locality: Rosslyn. Va. U.S.A.

Tarsonemus femorales Ewing, 1909. U. S. Dept. Agr. Tech. Bull, 653:38

Type host: *Rubus sp.*
Type locality: Rosslyn. Va. U.S.A.

Tarsonemus biungulatus Ewing, 1909, U.S. Dept. Agr. Tech. Bull. 653:50
Type host: *Malus* sp.
Type locality: Unknown.

Female body oval shaped, sclero tized, tanned in color. Gnathosoma 27μ long, 22μ wide, stylet 9μ long. Idiosoma 182μ long, 120μ wide, with dorsal plates finely punctuation, vertical setae (V) rather short, ca 1/3 as long as scapular setae which located on anterolateral angles of propodosomal plate. Scapular setae setaceous, 48 μ long, and whip-like, situated midway between anterol-ateral margins of hood and idiosomal suture. Pseudostigmatic organ as long as tibia I with broadly oval apice as long as slender pedial. Dorsum of hysterosoma with 5 tergites. All of dorsal setae on hysterosoma lanceolate, arising from strong tubercles. Anterol-ateral setae (La) of tergite I seta-like 19 μ long, and longer than others, situated lateral angles of tergite. La and La 96 μ, D, seta-like, 12 μ long, located on the base of tergite I. Dl and Dl 72μ, tergite II without seta. Two pairs of setae on Tergite III, lanceolate and subequal in length, D2 situated anterior margin of tergite III, and little shorter than D1. Postero-lateral setae (Lp) located on posterolateral margin of tergite III. D2 and D2 40 μ, Lp and Lp 76 μ long. One pair of setae on tergite IV, lanceolate 17 μ long, located on the anterial margin. D3 and D3 22μ, D4 on tergite V, which about as long as D3. D3 and D3 43μ. Apodeme I short and converging with anteromedian apo-deme forming a Y-shaped juncture and lower side with a short pair of simple setae which arises from tubercls. Apo-deme II stout and distinct, not conver-ging with anteromedian apodeme, and adjacently with a pair of simple setae twice in length to those of apodeme I. Transverse apodeme inverted with U-shaped bends on each side of juncture before connecting with anteromedian apodeme. Posterior median apodeme not converging with apodeme III and transverse apodeme. Apodeme III con-spicious, stout, anterior end broader than posterior edge, and above these, a pair of simple setae 17 μ long. Apo-deme IV longer and slender than apo-deme III with distal and with a pair of simple setae which half as long as the setae of apodeme III. Legs normal; tarsus I with 2 solenidia, proximal one arising from near base of segment, short, rod-like, 5 μ long, distal one long fusiform, arising 1/3 from base, 10 μ long. Tarsus II with a solenidion subequal in length to proximal one of tarsus I. Leg IV slender, 3rd segment more than 3 times as long as 4th seg-ment. Tracheal plates much longer and fusiform.

Collection data: Many females, Kauntien, Tainan Hsien, Rice leaf sheath, 15-VI-1976, (Y.H. Tseng); 6 females, Peikan Yunlin Hsien, Rice leaf sheath, 10-VIII-1976 (Y.H. Tseng); 3 females, South of Taipei, Rice leaf sheath, 20-IX-1976 (P.K.C. Lo):12.

2. *Tarsonemus gramineus* Cromroy (Figs. 3-7)

Tarsonemus gramineus Cromroy, 1958, J. Agric. Univ. P. Rico 42:94-95
Type host: *Paspalum paniculatum*
Type locality: Puerto Rico

Male gnathosoma 22 μ long, 21 μ wide, stylet 7 μ long. Propodosoma shield trapezoid, anterior covers the posterior edge of gnathosoma, bearing 4 pairs of propodosomal setae, first pair of setae about as long as gnathos-oma, P1 and P1 10 μ apart. Second pair of setae (P2) half as long as P1, P2 and P2 21 μ apart. Third pair of setae (P3) over twice as long as P1, 51 μ long, P3 and P3 26 μ apart. Fourth pair of setae (P4) lying to level of P3, short and subequal in length to the setae of second pair. Hysterosoma with 4 pairs of setae, La seta-like about as long as P1; Lp lanceolate, little shorter than La, 17 μ long; A pair of dorsoce-ntral setae similar in size of Lp. D1

slightly shorter than Lp. D1 and D1 22 μ apart. D2 half as long as La. Genitalum is shown in figure. Apodeme I distinct, extending from inner middle of coxa I, and converging with anteromedian apodeme forming a Y-shaped juncture. It has posteriorly a pair of spiniform simple setae. Apodeme II subparalled to apodeme I, about twice as long as the apodeme of first pair, extending from inner angles of coxa II, not coverging with anterior median apodeme. It has a pair of simple setae located well behind of apodeme II, which subequal in length to those of apodeme I. Transverse apodeme slightly concave in middle region. Apodeme III extends in anteromedial directions from anterior coedyle of coxa III, curving smooth inward at anterior thirds to join apodeme IV. Apodeme IV extends anteromedially in a nearly straight line from outer basal condyles of coxa IV to point of juncture with apodeme III, looping forward and converging with posterior median apodeme. Posterior median apodeme strong, straight and stout. First pair of ventral setae about as long as La, located anterior middle between apodeme III and IV. Second ventral hysterosomal setae slightly shorter than setae of first pair, situated on the apodeme IV at their posterior one third. Tarsus I with one blunt seta located the base of segment, 7 μ long. Tibia I with one pear-shaped solenidion located at the base of segment, near solenidion, outeromargin, with a short seta. Tarsus II with a rod-like, stout solenidion and a short, stout, spine-like seta and situated on the base of segment. Femur IV is angulate at base, 2,3 times as long as long as broad at base, 34 μ long, 14 μ wide. Coxa IV rectangular, about twice as broad as long, coxal seta spiniform, more or less as long as coxa. Proximal femoral seta short, 1/5 as long as femur, inner distal femoral seta rather stout, over 1/2 as long as segment, 22 μ. Outer distal seta about as long as inner distal femoral seta. Tibiotarsus twice as long as wide, with a tactile seta stout and slightly shorter than femur IV, 30 μ. Claw large, as long as tibiotarsus.

Collection data. 3 male, Tainan city, Rice leaf sheath 19-V-1977 (Y. H. Tseng); 2 male, Chiacian, Kaohsiung Hsien, Weeds, 30-V-1978 (Y. H. Tseng).

Note: Mite specimens of this species found from Taiwan have slight characters variation. First dorsal propodosomal setae (P1) 2 times as long as P2 (and not 1.5 times as long as P2); inner distal setae and outer distal seta of femur IV are subequal in length(not inner distal setae longer than outer pair). These differentiations, the authors feel, are not of any importance to establish a new species.

3. *Tarsonemus floricolus* Canestrini and Fanzago (Figs. 8-13)

Tarsonemus floricolus Canestrini and Fanzago, 1876, Atti Soc. Veneto-Trentine Sci. Nat. 5:140
Type host:Flowers
Type locality:Italy

This species can be easily distinguished from other species of genus *Tarsonemus* for having the Leg IV not extending to caudolateral of idiosoma and basal setae of third segment rather long, which is subequal in length to apical seta of third segment of female.

Female gnathosoma 36 μ long, 24 μ wide at base. Idiosoma oval, subparalled in each side. Propodosomal shield somewhat trapezoid, anterior slightly projects and covers the base of gnathosoma, bearing 2 pairs of setae. Vertical setae (V) lying the anterior angles of the shield, as long as long as gnathosome; scapular (Sc) setae located the midline of propodosomal shield, twice in length to the vertical setae, smooth and setiform, 58 μ long. Pseudostigmatic organ conspicuious, with narrow pedicels supporting broad ovoid terminal, pedicels inserted basally on subcircular, sclerotized plate with diameters as long as width of expanded apices of organ located between and dorsally

from coxa I and II. Hysterosoma with 5 tergites and 6 pairs of hysterosomal setae. These setae arrangement are shown in figure. Apodeme I rather long, converging with anterior median apodeme, but anteriorly not joining with codyles of coxa I. Apodeme II twice in length to apodeme I and not converging with anterior median apodeme. A pair of small, simple setae located well-behind apodeme I. The second pair of ventral setae located on the middle of apodeme II, which twice in length to the setae of first pair. Transverse apodeme U-shaped. Apodeme III and IV with a pair of subequal simple setae. Apodeme IV converging within width of posteromedian apodeme; posteromedian median apodeme forming a Y-shaped in anterior part. Tarsus I with 2 solenidia, distal one situated in midway of segment, fusiform, proximal one about half as long as distal, and located dorsolaterally at about half the length from base of segment. Pretarsus I with a large pulvillus and with single, strongly curved and sharp claw, a spur-like projection arising from the terminal of tarsus I. Tarsus II with 2 solenidia, proximal rod-like, situated in front of stout spine-like setae, distal similar in size and subequal in length to proximal. Legs IV rather short, not reaching of posteromargin of idiosoma, third segment more than twice as long as fourth segment, 22 μ long. Basal setae conspicuious, about 1/3 as long as segment. Subapical setae of third segment subequal in length to basal setae. Fourth segment, 10 μ long. Subapical setae stouter than apical setae, 24 μ long. Apical setae whiplike, about 2 times as long as subapical setae. Idiosoma 144 μ long, 101 μ wide.

Male. Unknown

Collection data. 3 females, Tonjin, Chiayi Hsien, ex:Grapes. 11-II-1972 (Y.H Tseng); 1 female, Panchiao, Taipei Hsien, ex:Grapes, 7-IX-1972 (Y. H. Tseng); 2 female, Holi, Taichung Hsien, ex: Grapes, 23-XI-1972 (Y. H. Tseng); 1 female, Tari, Taipei Hsien, ex:Rcie leaf sheath, 30-XII-1976 (P. K. C. Lo)

4. *Tarsonemus wani* new specis (Figs. 14-20)

The female of this species is closely related to *Tarsonemus floricolus* by having the first ventral well behind apodeme I and leg IV short. But this species can be easily dstinguished from *T. floricolus* for having femur I with a lanceolate seta and the shape of subapical seta of fourth segment as shown in the figure and the capitulum wider than its length.

Female. Capitulum nearly triangular, wider than its length 29 μ long, 36 μ wide. Chelicera form a stylet, pierce-shaped. Propodosoma. I shield hemicircular; vertical setae about half as long as scapular setae. Scapular setae 41 μ long, located behind the base of pseudo stigmatic organ. Pseudostigmatic organ conspicuious, with long, narrow pedicels supporting broad ovaid termina. Pedicels inserted basally on subcircular, scleoized plate with diameter slightly longer than width of expanded apices of organ. Hysterosoma divided into 4 indistinct hysterosomal plates; first tergite with 2 pairs of setae. La located on the anterior angles, D1 situated on the posterior tergite; D2 on second tergite and located at the posterior edge of tergite; D3 and Lp subequal in length, these setae lying in the same transverse line. Fourth tergite bears a pair of setae (D4) and located at the base of tergite. The setae on hysterosoma setiform. Apodeme I short and converging with anteromedian apodeme forming a Y-shaped juncture, and well-behind with a short pair of simple setae. Apodeme II slender, with anterior extremity of inner coxal condyle II not converging with anteromedian apodeme. A pair of short and simple setae on apodeme II. Transverse apodeme inversed with U-shap. Apodeme III with inversed Y-shape, not jointed to posterior median apodeme. Apodeme IV

slender, not converging with posterior median apodeme. Setae adjacent to apodeme III and IV simple, subequal in length, and slightly longer than setae on ventral propodosome. Genital cleft shown as figure. Legs normal; tarsus I with a long fusiform solenidion about 1/3 as long as segment, which arises at 1/3 length of segment from the base. Tarsus II with 2s olenidion, distal about half as long as segment, located at the midway of segment, proximal slightly shorter than the distal, situated near the base of segment. A stout spurlike seta located behind the distal solenidion. Leg IV short, third segment 19 μ long, 5 μ wide, basal seta slightly shorter than subapical seta, subapical seta more than half the length of segment; Fourth segment 7 μ long, 4 μ wide, subapical seta swollen from the base to 1/3 the length of seta 17 μ long. Apical seta about as long as conbined lengths of third and fourth segments.

Collection data: Holotype female, South Taipei, ex Green algae on surface of paddy field, 25-II-1977 (P. K. C. Lo); Para type, 2 females, the same data as for holotype.

Note: This species could be included in the genus *Steneotarsonemus* for the capitulum wider than long, but referring to the mouthparts of gnathosoma, the authors suggest that this species should belong to the genus *Tarsonemus*. This new species is named in honor of Dr. H. Wan the Director of Taiwan Agricultural Research Institute.

Genus *Xenotarsonemus* Beer

Xenotarsonemus Beer, 1954. Univ. of Kansas. Sci Bull. 36 (Pt. 2, No. 16): 1314

Genotype: *Tarsonemus virudis* Ewing

The female of this species is characterized by having the inner margin of coxa IV separated by a distance less than width of the coxa and leg IV never extend to the caudolateral margin of body. Propodosomal shield projects forward and covers most of the capitulum. Leg IV with three segments, coxa, femur, and tibiotarsus, the latter expanded bulbbousely at tip, bearing a stout, curved spine on outer margin near base, one long, stout, apical seta and two short, apical setae. Femur with inner margin produced into a small spur-like processes; tibiotarsus I with a long, broad seta more than half as long as segment, located near outer margin of base.

5. *Xenotarsonemus rivalis* new species (Figs. 21-26)

Taxonomically resembles the species *Xenotarsonemus virudis* Ewing by having the inner margin of coxa IV separated by a distance less than width of the coxa, and leg IV never extend to the caudolateral margin of body. But *X. rivalis* can easily be distinguished from *X. viridis* by the propodosomal shield covers only the base of capitulum. vertical setae about 1/6 as long as scapular setae.

Female Copitulum 39 μ long, 29 μ wide at base; palpi elongated, cylindrical. Idiosoma lemon-shaped, broadest in region of main body suture. Propodosomal shield trapezoidal, slightly projecting anterior, bearing a pair of propodosomal setae. Vertical setae (V) seta-like, about 1/3 as long as capitulum, located at the anterior margin of propodosomal shield, 12 μ long. Scopular setae (Sc) whip-like, about 6 times as long as vertical setae, 72 μ long and located behind arcoli of pseudostigmatic organ at 2/3 the distance beween base of pseudostigmatic organ and propodosomal shield. Pseudoatigmatic organ with expanded, ovate apices slightly longer than narrow pedicels. Arcoli with diameters nearly equal to width of expanded apices. Hysterosoma with 4 tergites and 6 pairs of setae those setae are stout, short and lanceolate except La setae setiform. First tergite with 2 pairs of setae subequal in length and arranged in a transverse line 8 μ long. D1 and D2 43μ long. Second tergite with a pair of dorsocentral setae (D2), 8 μ long, D2 and D2 43 μ apart. Two pairs of setae arising from. Third

tergite, 8 μ long, D3 and D3 18 μ apart. D4 8 μ long and bears on the fourth tergite. Tracheal plate V-shaped as shown in figure. Apodeme I distinct, converging with anterior median apodeme to form a Y-shaped juncture with anterior extremity of median apodeme. Anterior of apodeme not joint with extremity coxa I. First pair of ventral propodosomal setae just located behind the apodeme I, minute, 3 μ long. Apodeme II long and stout, twice as long as apodeme I, neither converging with coxa II nor joint anterior median apodeme. Second ventral propodosomal setae more or less 4 times as long as first pair propodomal setae and located adjacent to the apodeme II. Anterior median apodeme rather short; transverse apodeme absent. Apodeme III slender and slightly curved downward and above this, a pair of long simple setae about 1.5 as long as second ventral hysterosomal setae. Apodeme IV converge with extremity of coxa IV. A pair of setae arise from outermargin and midway of apodeme IV. Anal openning shown as in figure. Legs short; leg I with 4 segment, coxa rectangular about 3 time as wide as long, femur broader than its length with one seta, genu about twice as broad as long, bearing 4 pairs of setae, tibiotarsus with 6 normal setae and one fusiform solenidion, pretarsus as shown in figure. Leg IV very short, about as long as femur III; third segment 13 μ long, about 2 times as long as fourth segment, subapical seta pine leaf-shaped, about as long as fourth segment; fourth segment 7 μ long. Apical and subapical setae stout, blunt, dagger-like, subapical setae subequal in length to third segment, apical setae more 1.5 times longger than subapical setae, 34 μ long.

Collection data. Holotype female, Pingtung Hsien, ex lichen, 22-V-1972 (Y. H. Tseng) Paratype, 3 females the same data as for holotype.

Genus *Steneotarsonemus* Beer.

Steneotarsonemus Beer, 1954 Univ. Kans. Sci. Bull. 36:1229-1230

Genotype: *Steneotarsonemus hyaleos* Beer.

The extensive diversity in specific characters of this genus are as follows: All males with one exception have the doral propodosomal setae in lindar arrangement, the usual number being 4 pairs; femora IV usually have the inner margin hightly modified to form a flange like procers, never with a spur-like projection. Capitulum is usually subcircular; the females never with a conspicunus transverse apodeme near main body suture, and the body is often elongate.

6. *Steneotarsonemus chiaoi* new species (Figs. 27-35)

This new species is closely similar to that of *S. hyalcos* Beer by having fourth dorsal propodosomal setae of male longer than setae of other three. Females are without posterior median apodeme. But the male of species *S. chiaoi* easily be distinguished from *S. hyalcos* for having no densely punctuate on coxae III, the first pair of propodosomal setae about twice in length to the second pair propodosomal setae, first ventral hysterosomal setae subequal in length coxae III (in *S. hyalcos* it is about half as long as coxae IV); the female, pseudostigmatic organ narrow leaf-shaped.

Male body is oval, broadest in region of metapodosoma. Propodosomal shield somewhat trapezoidal, bearing 4 pairs of simple, short and stout setae. Setae of second pair weaker than others. Fourth pair of propodosomal setae 2 times as long as setae of first pair. Anterior three pairs of setae on anterior half of propodosomal shield, arranged nearly equidistant from each other. Fourth pair of dorsal propodosomal setae located behind third pair at a distance equal to distance from anterior margin of propodosomal shield and the third pair, P1 11 μ, P1 and P1 7 μ apart, P2 5 μ, P1 and P2 10 μ, P2 and

P2 24 μ apart, P3 16 μ, P3 and P3 30 μ apart, P4 and P4 31 μ apart, P4 19 μ, P2 and P36 μ, P3 and P4 22 μ, Hysterosoma with 4 pairs of smooth setae. La setae-like, 14 μ long, others subequal in length, stow, slightly longer than La. D1 and Lp arranged in a transverse line. Lp 12 μ long, D1 and Lp 19 μ, D1 and D1 36 μ, D1 10 μ; D2 lanceolate, 10 μ long, D2 and D2 22 μ. Ventral setae on idiosoma rather stout. Coxae I with single pair of setae, slightly shorter than single pair on coxae II, located along the width of tarsus I from midline. Setae of coxae II situated near conters of coxa defined by apodeme II. Coxae III with 2 pairs of setae, the setae of first pair about 4 times as long as second pair, setiform, located on and equidistance from cenited anterior extremities of apodeme III and IV, the second pair of setae subequal in length to the setae on coxae II, stout and situated within defined by apodeme III and IV. Ventral apodomes shown as in figure. Apodeme I short and stout, curving to coxal condyles, and forming Y-shaped juncture with anterior median apodeme. Anterior median apodeme well defined but becoming small and indistinct at the anterior of apodeme II. Apodeme II strong, about 3 times as long as apodeme I, but no converging with anterior median apodeme. Apodeme III and IV converging distinctly, defining an area broadest at anterior extremities of coxae III. Posterior median apodeme distinct, well-defined from point 1/3 behind anterior extremities of apodeme III and IV to hind margin of coxae IV. Genital papilla 25 μ long, 34 μ wide, heart-shaped. Legs rather short and stout; tibia III with a stout, spur-like setae, tarsus III with a spur like setae smaller than the setae on tibia III. Leg IV with coxa twice as wide a long, a single setae located on the ventral surface of posterolateral angle. Femur longer than width at base, inner and outer margin strong convex, with flanglike expansion at inner median. Three distinct setae on segment, proximal femoral setae on inner margin just beyond base of flange connection with femur proper, short, setiform, 10 μ long; inner distal femoral setae twice as long as proximal, situated near the margin just beyond distal extremity of flange connection; outer distal femoral setae subequal in length to proximal femoral setae, located dorsally between apex and base of femur. Tibia longer clavate sensory setae about as long as the width of the segment located dorsally near outer margin. Tactile setae slightly shorter than inner distal femoral setae but similar in size. Tarsus short, bearing 2 tiny setae and with a rather small ventrally curved claw. Body 192 μ long, 115 μ wide.

Female body elongate, narrow. Propodosomal shield somewhat trapezoidal, bearing 2 pairs of setae, vertical setae stout and slightly serrate, 17 μ long; scapular setae 48 μ long, setiform, about subequal in length to anteromedian apodeme, situated midlength of propodosomal shield. Pseudostigmatic organ with expanded apices leaf-shaped, bearing small spur-like projections on the expanded apice, narrow pedicels about 1/4 as long as expanded apices, organs arises from heavily sclerotized, circular plates. Dorsum of hysterosoma with 4 distinct tergites; first tergite bears 2 pairs of setae, D1 stout shorter than La, 10 μ long, La setae-like, 17 μ long, D1 and D1 36 μ. Second tergite with a pair of setae, D2 slightly longer than D1 and similar in size, 12 μ long, D2 and D2 38 μ. Two pairs of setae arising from tergite subequal in length to D1; D3 and Lp 14 μ, D3 and D3 22μ. Fourth tergite with a pair of setae about 1.5 as long as D1. Apodeme I short, distinct and converging with anterior median apodeme forming a Y-shaped juncture, and adjacently with a long setae, 20 μ long. Apodeme II twice as long as apodeme I, anterior not converging with extremity of coxa II, posterior conver-

ging with anteromedian apodeme, and lower side with a spine-like setae less 1/2 as long as the setae on apodeme I, transverse apodeme indistinct. Apodeme III conspicuous, stout, about as long as coxa III and above this there is a setae, simple, about 2 times as long as coxa III, 38 μ long. Apodeme IV converging anteriorally, terminating opposite midlength of coxa III, two thirds the distance from inner margin of coxa III to midline. A setae, 8 μ long, located on outer margin of the posterior extremity of apodeme IV. Tracheal plate shown as in figure. Tibiotarsus I with an annulated sensory seta and one rod-like seta; tarsus II with fusiform solenidion, located midway of segment. Leg IV normal; third segment twice in length as the fourth segment, basal seta minute, subapical seta lanceolate, 10 μ long; subapical seta of fourth segment stout, daggershapped, with subequal in length to third segment, apical seta of fourth segment whip-like, about 4 times as long as subapical seta. Gnathosoma 31 μ long, 28 μ wide; idiosoma 232 μ long, 116 μ wide.

Collection data. Holotype, male, Sulin, Taipei Hsien, ex Rice leaf sheath, 1-IV-1976 (Y. H. Tseng); Allotype, female, the same data as for holotype paratype, 3 females, 2 males, Tari, Taipei Hsien, ex Rice leaf sheath, 2-IV-1977 (P. K. C. Lo).

This new species is named in honor of Director H. T. Chiao of Tainan Branch office, Bureau of Commodity Inspection and Quarantine, Ministry of Economic Affairs, for his kind encouragements.

7. *Steneotarsonemus pulchellus* new species (Figs. 36-44)

This new species is similar to that of species *S. ananas* for having the first pair of dorsal propodosomal setae shorter than other three pairs of propodosomal setae of male But this new species can be easily distinguished by male having leg IV small and short; Pseudostigmatic organ of female with expanded apice egg-shaped but accumulated at terminal.

Male capitulum nearly rectangular, 34 μ long, 38 μ wide. Idiosoma olive-shaped, broadest slightly behind main body suture midway between coxa II and III, 226 μ long, 137 μ wide. Propodosomal shield weak sclerotized, trapezoid, bearing 4 pairs of stout propodosomal shield; first pair about 1/3 as long as capitulum (12 μ long), second pair of setae longer than the setae of first pair (19 μ long), third pair about four times as long as second pairs (67 μ long), fourth pair of setae twice in length to second pairs (33 μ long). Hysterosoma with 4 pairs of setae, La longest, 34 μ long; D1 about 1/3 as long as La; D2 about twice in length as D1. Apodeme I long, blunt, curving to coxal condyle I and forming Y-shaped juncture with anteromedian apodeme. Anteromedian apodeme well defined converging with apodeme I in the middle area between coxae I and II. Apodeme II stout, about 1.5 as long as apodeme I, but not coverging with anterior median apodeme. Two pairs of ventral propodosomal setae, short and subequal in length first pairs located well behind apodeme I, the second pairs situated much behind apodeme II; transverse apodeme indistinct. Apodeme III jointed to apodeme IV. Apodeme IV not coverging with posteriormedian apodeme. Apodemal plate with 2 pairs of setae, first pair arising just behind apodeme III, about twice as long as that of second pair. Second pair of setae arises near the midway of apodeme IV. Legs rather stout, the setae an dorsal aspect of legs stout. Leg IV short and small, coxa twice as broad as long, femur slightly longer than the width with larger inner median lateral flange. Proximal femoral setae minute, outer distal femoral setae about twice as long as inner distal femoral seta. Inner femoral setae stout, lanceolate, about 1/3 as long as segment. Tibiotarsus subequal in length to

femur, tactile setae stout, twice as long as inner dlstal femoral setae, clavate setae distinct, cylindrically.

Female body elongate, subparalled in side. Capitulum nearly rectangular, wider than the length 36 μ long, 43 μ wide at base. Propodosomal shield bears 2 pair of setae; vertical setae about 1/3 as long as capitulum; scapular setae 5 times as long as vertical. Pseudostigmatic organ with expanded apex broadly oval with tip, pedicel slender with about 3/5 in length to expanded apice diameter. Two sclerotized plates situated midway between coxae I and II. Hysterosoma with fourindistinct tergites; first tergite bears 2 pairs of setae, second and fourth each bears a pair of setae, third tergite with 2 pair of setae. Apodeme I distinct, blunt and heavily sclerotized extending to condyle coxa I and joined to anterior median apodeme forming a Y-shaped juncture with a pair of short, simple setae adjacent to the apodemes I. Apodeme II stout, about as long as apodeme I, converging with the end of anterior median apodeme forming a converse Y-shape, a pair of simple setae well behind apodeme II; transverse apodeme absent. Apodeme III obscure and above it is a pair of long simple setae about 5 times as long as those of setae situated adjacent to apodeme IV. Apodeme IV slender, not converging with coxa IV, posterior median apodeme absent. Legs rather short, legs III stouter than other legs; leg IV slender, third segment about 8 times as long as wide, 24 μ long, 3 μ wide, basal setae 5 μ long, fourth segment 1/4 as long as third segment, subapical setae slightly shorter than twice in length to segment, apical setae whiplike, much longer than leg IV. Idiosoma 250 μ long, 110 μ wide.

Collection data. Holotype male, Talli, Taichung Hsien, ex weeds, 4-XII-1977 (Y.H. Tseng); allotype, female, the same data as for holotype; paratype, 2 male, 1 female, the same data as for holotype; 2 larvae and 2 pupae stage, the same data as for holotype.

8. *Steneotarsonemus spinki* Smiley

Steneotarsomemus spinki Smiley, 1967, Proc. Ent. Soc. Wash. 69(2):129-131
Type host: *Sogata orizicola* Muir
Type locality: Boton Rougo, La., U. S. A.

Steneotarsonemus medecassus Gutierrez, 1967, Bull. Soc. Ent. France 72:323-330. new synonym.
Type host:rice
Type locality: Tananarive.

This species is characterized by having a long rodlike solenidion dorsally on tarsus I and bifurcats spur-like setae on the distal ventral surface and a pair of dagger shaped setae on femur and genu IV, and a short, blunt spur-like setae on tibia III.

S. spinki is wide distributed in Taiwan, it can be found in the rice field throughout this island.

9. *Steneotarsonemus furcatus* Deleon (Figs. 45-48)

Steneotarsonemus furcatus Delem, 1956, Fla. Ent. 39:168
Type host:*Paspalum* sp.
Type locality: Lychee.

Female body olive-shaped. Gnathosoma 31 μ long, 24 μ wide. Idiomsoa 211 μ long, 115 μ wide. Propodosomal shield bears 2 pairs of setae; vertical setae smooth, short, 14 μ long, located at the anterolateral angle of shield and slightly in front of inner angle of coxa I; scapular setae stout and lancelate 19 μ long, about 1/5 as wide as idiosoma situated well behind midway between anterolateral margin of hood and idiosomal suture. Peudostigmatic organ with expanded apices subcircular in outline, narrow pedicel ewith length about half the diameter of expanded apex. Tracheal plate shown as in figure. Hysterosoma transected by 4 tergites; La setalike, D1 stout and lanceolate, La and D1 subequal in length, 1s μ long, D1 and D1 30 μ; second tergite with D2 setae, slightly shorter than D1, situated posterior margin of tergite, D2

and D2 34 μ; third tergite with 2 pairs of setae, Lp located at the porterolateral margin of tergite, D3 and Lp subequal in length, D3 10 μ long and Lp 14 μ; D4 located the posteroangle of tergite IV, slightly longer than D3, 12 μ long, D4 and D4 12 μ. Apodeme I short, distinct, converging with anterior median apodeme forming a Y-shaped juncture, cenverging anterally in line with anterolateral angles of coxa I. Apodeme II lenger than apodeme I, extending from inner angle of coxa II, and not converging with anterior median apodeme. First pair of ventral propodosemal setae, tiny, located behind of apodeme I, second pair of ventral propodosomal setae short and stout, about 1.5 times as long as the first pair, located slightly behind apodeme II. In front of apodeme II the anteromedian apodeme distinct and developed, its appearance indistinct for a short distance and absent from its midlength to main body suture; transverse apodeme U-shaped, indistinct in midline. Apodeme III conspicuous, stout and enlarged in anterior apex, above these with a pair of simple long setae, 17 μ long, 22 μ apart. Apodeme IV about subequal in length to apodeme III, not converging with posteromedian apodeme, with a pair of tiny setae about 1/3 as long as setae of apodeme III, located just anterior to caudal extremity of apodeme IV. Leg IV normal; third segment about 4 times as long as fourth segment (29 μ long), basal setae 5 μ long, subapical setae 7 μ long; subapical setae of fourth segment half as long as the length in third and fourth segments conbinded, apical setae much longer than leg IV. Tarsus I with 2 solenidia, proximal rodlike, situated near the base of segment, distal fusiform, slightly longer than proximal, located in the midlength of segment. Tarsus II with a rod-like solenidion situated near the base of segment, behind the solenidion, bearing a stout and spine-like setae. Genital plate as shown in the figure.

Male body oval, broadest just anterior to forward extremities of coxae III. Capitulum as long as wide, 24 μ long, basal part covered by projection of propodosomal shield. Propodosomal shield tropezoid and weakly sclerotized with 4 pairs of propodosomal setae; first propodosomal setae half as long as capitulum (12 μ long), located equal in length of setae behind thd anterior margin of propodosoma to the base of setae; second pair of setae with length equal to 3/5 the length of first pair; third pair of setae slightly shorter than the length of capitulum (19μ long) situated the midway of propodosomal shield; fourth pair of setae as long as the setae of first pair, situated at the distance equal to the length of the third pair. Hysterosomal with 4 pairs of setae, or seta like structures subequal in length. Apodeme I conspicuous and well defined, extending in anteromedial direction from inner most angle of coxa I and converging with the anterior median apodeme forming a Y-shaped juncture. Apodeme II slightly longer than apodeme I, stout and distinct, not converging with anteromedian apodeme. First pair of ventral propodosomal setae minute, located well behind the apodeme I; second pair of ventral propodosomal setae situated well behind apodeme II. Simple, subequal in length to those of first pair ventral propodosomal seta; transverse apodeme nearly straight transverse line, absent in midway. Apodeme III not converging with apodeme IV. Apodeme IV not connecting with posterior median apodeme. The first pair ventral hysterosomal setae lying in the anterior of apodeme III, simple, about twice as long as second pair of ventral hysterosomal setae; second pair of ventral hysterosomal setae located adjacent to apodeme IV. Legs normal; femur IV twice as long as its width at the base, proximal femoral setae bifurcate, inner distal femora setae about 1/3 as long

as segment, outer distal setae minute; tibia IV 2.5 times as long as wide, tactile seta twice in length to segment, clavate setae minute.

Collection data. 3 males 4 females, Pingtung city, ex. Rice leaf sheath, 16-X-1975 (Y. H. Tseng); 2 males, 2 females, Tsuton, Yunlin Hsien, ex weeds, 21-III-1976; 5 females, Silo, Yunlin Hsien, ex weeds, 27-III-1976; 1 female, 1 female, Taitung, ex Rice leaf sheath, 20-V-1976; 3 males, 2 females, Kauntien, ex weeds, Tainan Hsien, 19-X-1976; 2 females, Tarl, Taipei Hsien, ex Leaf sheath of weed, 1-XII-1976 (P. K. C. Lo); 1 male, Kuantien, Tainan Hsien, ex *Echinochloa colona*, 4-X-1977 (P. K. C. Lo); 2 males, 2 females, Lotung, Ilan Hsien, ex Rice leaf sheath 19-X-1977 (P. K. C. Lo); 3 males 1 female, Kuantien, Tainan Hsien, ex *Paspalum conjugatum*, 12-XI-1977 (C. C. Hor).

Genus *Polyphagotarsonemus*

Polyphagotarsonemus Beer and Nucifora, 1965. Bull. agraariaedi Bachicoltura per. 11(7):25.

Genotype. *Tarsonemus lactus* Bank

The characters of this genus are as follows: The tibia and tarsus IV of the male are fused to form a tibiotarsal segment bearing a buttonlike claw, and coxae III and IV of the male are distinctively contiguous; the legs II and IV of the female do not have claws.

10. *Polyphagotarsonemus latus* (Banks)

Tarsonemus latus Baks, 1904, J. N. Y. Ent. Soc. 12:615.
Type host: mango
Type locality: Washington, D. C.

Acarus translucens Green, 1800, Colombo, Ceylon 2
Type host: tea
Type locality: Ceylon

Tarsonemus translucens, Green, 1913, Rept, Govt. Ent. Dept. Agr. Ceylon. IV:2-5

Hemitarsonemus latus, Ewing, 1939, USDA Tech. Bull. 635:54

Polyphagotarsonemus latus, 1965, Bull. agrariaedi Bachicottura per. 11(7):25

The female of this species is characterized by the first pair of dorsal propodosomal setae being longer than the second pair, and an extra pair of ventral hysterosomal setae situated between coxae IV.

P. latus are always found on tea, citrus and bean in Taiwan.

Genus: *Cheylotarsonemus* new genus

This new genus can be easily distinguished from the other genera of Tarsonemidae by having leg IV much short, coxae IV well separate, leg I with a claw, and the capitulum not projecting beyond outline of idiosoma.

The characters of this new genus are as follows: legs I and II with a claw; capitulum triangular, lying between coxae II.

Genotype. *Cheylotarsonemus minutus* n. sp.

11. *Cheylotarsonemus minutus* new Species (Figs 49-52)

Female capitulum triangular, large, longer the width, 28μ long, 22μ wide, lying between coxae II, palpi elongated. Idiosoma oval, 108μ long, 77μ wide. Propodosomal shield bears 2 pairs of setae; vertical setae about half as long as scapular setae, located at the anterior margin of propodosomal shield; scapular setae arising 2/3 in length from base to anterior of shield, about 1/3 as long as idiosoma. Pseudostigmatic organ with short, thin pedicel, about 1/3 the length of broad capitate apice, the latter being 3 times as long as broad (26 μ long), width equal to width of femur I, organ mounted on ring-like basal plate with diameter equal to 1/2 width of expanded apice of organ, located a distance equal to diameter behind posterior extremity of coxa I. Hysterosoma transected by 4 tergites, bea ring 5 pairs of setae, setiform, and subequal in length. Legs short; pretarsus I and II with single claw, pulvillus absent; leg III composed of four segments, the coxa, the femur and the genu and the tibiotarsus. Tibiotarsus as long as genu, femur half in length as genu.

Leg IV much shorter, no longer than half the distance between the base of coxae IV. Third and fourth segments subequal in length being 5 μ long, subapical setae about twice in length to segment, apical setae 2 times as long as subapical seta. Apodeme I, II, IV, anterior and posterior median apodemes absent, apodeme III short, indistinct, transverse apodeme U-shaped. U-shaped.

Collection data. Holotype, female, Hsinsu, Tainan Hsien, ex Rice leaf sheath, 5-V-1977 (Y. H. Tseng): paratype, female, the same as for holotype.

Genus *Fungitarsonemus* Cromroy

Fungitarsonemus Cromroy, 1958, J. Agr. Univ. Puerto Rico Vol XL11(2):113

Genotype: *Hemitarsonemus peregrinus* Beer.

This genus is characterized by having 4 segments in leg IV of the male; i. e. the coxa, the femur, the tibia and the tarsus. The body of the male is laterally compressed, and that of female is strongly convex dorsally. Female wite with dorsal propodosomal setae. approximately both pairs located on anterior third of propodosomal.

12. *Fungitarsonemus borinquensis* Cromroy (Figs 53-53-61)

Fungitarsonemus borinquensis Cromroy, 1958, J. Agr. Univ. Puerto Rico. Vol XL11 (2):113-115

Type host: *Coffea arabica*

Type locality: Maricao Insular Forest, Puerto Rico.

Male capitulum short, as long as wide at base (24 μ long), basal pair is covered by propodosomal shield; chelicera, 5 μ long, Propodosomal shield; with 4 pairs of propodosomal setae; first pair about 2.5 times as long as long as capitulum (60 μ long); second pair minute, 4 μ long, located at the midlength between first and third pair, third pair whip-like, about 1.5 time as long as first pair, situated at the 1/3 area from base to anterior of shield, fourth pairs located posterolateal of third pair, about twice in length to second pairs, Hysterosoma with 4 pairs of setae; La whip-like, about as long as first pair of propodosomal setae; other hysterosomal setae short, setae-like, and nearly subequal in length. Apodeme I conspicuous, well dell defined, extending in anteromedial direction from inner most angle of coxa I and joined to anterior median apodeme forming a Y-shaped juncture, a pair of simple setae behind to the first pair of apodemes. Apodeme II about 1.5 times as long as apodeme I, strong but not converging with anteromedian apodeme, a pair of simple setae well behind apodemes II, anteromedian apodeme well defined and joined to transverse apodeme becoming inconspicuous near midline, trans-verse apodeme straight, well-defined. Apodeme III not converging with apodeme IV, and apodeme IV not joined to posteromedian apodeme. A pair simple setae located at the anterior of apodemal plate, slightly behind anterior of apodeme III; second ventral hysterosomal setae at the posterior of apodemes IV. Legs rags rather slender, tarsus I with a solenidion expanded towards the base, solenidion on tarsus II similar in size of the solenidion on tarsus I. Leg IV thin and slender, coxa nearly triangular, 1.5 times the wider than its length, femur 4 times as long as it is wide at base (48 μ long), proximal femoral setae and outer distal femoral setae minute, subequal in length, inner distal femoral setae rather thick, and about 1/4 as long as femer; tibia 16 μ long, 6 μ wide, tactile setae about as long as the length of femur and tibia conbined; claw sharp and developed. Idiosoma 120 μ long, 77 μ wide.

Female idiosoma egg-shaped sclerotized, 168 μ long, 132 μ wide. Propodosomal shield bears 2 pairs of setae, vertically 48 μ long, arising from anterior margin of shield; scapulars setae subequal in length to idiosoma

width, 132 μ long, located the the midway of shield. Pseudostig-matic organ with expanded apex subcircular with diameter equal to 1/2 length of organ, pedicel short, slender, basal ring with diameter equal to 2/3 diameter of enlarged apex. Hysterosoma with 4 tergites and 6 pairs of setae, setae on hysterosoma setae-like and subequal in length; first and third tergites each bears 2 pairs of setae, second and fourth tergites each bears one pair of setae. Capitulum as long as wide, 34 μ long, not projecting beyond outline of idiosoma and overreached by the advancing anterior pole of idiosoma. Apodemes as shown in the figure; ventral setae short and simple, first ventral propodosomal setae adjacent to the apodeme I, second pair of ventral propodosomal setae located on the apodemes II; second pair of ventral hysterosomal setae situated posterior of apodeme IV. Leg IV slender; third segment about 1/2 as long as it is wide (38 μ long), basal setae equal in length to subapical setae, subequal setae strong; fourth segment 1/4 as long as third segment, subapical setae blunt and horn-like, about twice as long as segment (17 μ-long); apical setae about 3 times long as segment (27μ-long).

Collection data. 3 males, 6 females, Matou. Tainan Hsien. ex *Annona* sp, I-IV-1978 (Y. H. Tseng)

Genus: *Neosteneotarsonemus* a new genus

This new genus is more or less similar to the genus *Steneotarso-nemus* Beer for having the capitulum as long as is wide. and idiosoma of the female elongate. But this new genus can easily be distinguished by pseudostigmatid organ being setaceous, and the scapular setae located in the posteromedian area of propodosomal shield.

The species belonging to this genus have the following characters: Capitulum as long as it is wide, oval-shaped chelicera to form a pierce-like; idiosoma elongate; propodosomal shield bears 2 pairs of setae, scapuular setae located nearly at the midline of posterior edge of shield, stout and horn-like; 5 pairs of setae arising from hysterosoma.

Genotype: *Neosteneotarsonemus mirabilis* a new species

13. *Neosteneotarsonemus mirabilis* new species (Figs 62—71)

Female capitulum 31 μ long, 36 μ wide, pear-shaped, chelicear visible, 7 μ long. Propodosomal shield some what trapezoid, bearing 2 pairs of setae; vertical setae stout setaceous, half as long as capitulum; scapular setae horn-like, slightly longer than verticals (19 μ long), situated at the posteromedian of propodosomal shield. Hysterosoma with 4 distinct tergites; first tergite bears 2 pairs of setae, La setaceous, 12 μ long, D1 short and stout, fusiform, which as shown in the figure, 7 μ long, D1 and D1 36 μ, D2 arising from second tergite, short, stout fusiform, about equal in length to La; third tergite bears 2 pairs of setae, short, spiniform, and subequal in length, and about half as long as D2; D3 and D3 12 μ apart; fourth tergite with a pair of setae, D4 setaceous, about equal in length to D2. Tracheal plate as shown in the figure. Apodeme I distinct, blunt and heavily sclerotized, extending posteriomedially from inner condyles of coxa I, intersecting medially at anterior extremity of median apodeme, a minute seta located well behind apodeme I. Apodeme II subparalled to apodeme I, about twice as long as apodeme I, extending from inner condyles of coxa II, not converging with anterior median apodeme. A stout seta located well behind apodeme and twice as long as the first pairs, anterior median apodeme forming a Y-shaped juncture; transverse apodeme absent. Apodeme III stout, spatulate terminally, with a simple setae, 19 μ long above it. Apodeme IV short and slender, a short setae about 1/3 as long as first ventral hysterosemal setae, located at the posterior of apodeme IV;

posterior apodeme indistinct. Legs normal; tarsus I with a solenidion swollen at the middle which arises from the dorsal side midway along the segment, pretarsus I bears a large pulvillus and a single claw; tarsus II with a solenidion swollen terminally and located near the base of segment. In front of the solenidion, bears a stout spine like setae. Third segment of leg IV slender, 31 μ long, about 13 times as long as it is wide, basal setae spiniform, subapical seta less than half in length than the third segment (12 μ long); fourth segment 1/3 as long as third segment; subapical seta half as long as leg IV, horn-like, apical setae about 3 times as long as subapical setae,

Collection data. Holotype, female, Tari, Taipei Hsien, ex Rice leaf sheath, 5-X-1977 (Y. H. Tseng); Paratype, 5 females, Tari, Taipei Hsien, ex Rice leaf sheath, 30-VIII-1976 (P. K. C. Lo); 3 females, Banchiou, Taipei Hsien, ex. Rice leaf sheath, 20-IV-1977 (C. T. Yang).

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臺灣細蜎科之種類調查（蜎蜱亞綱：前氣門目）

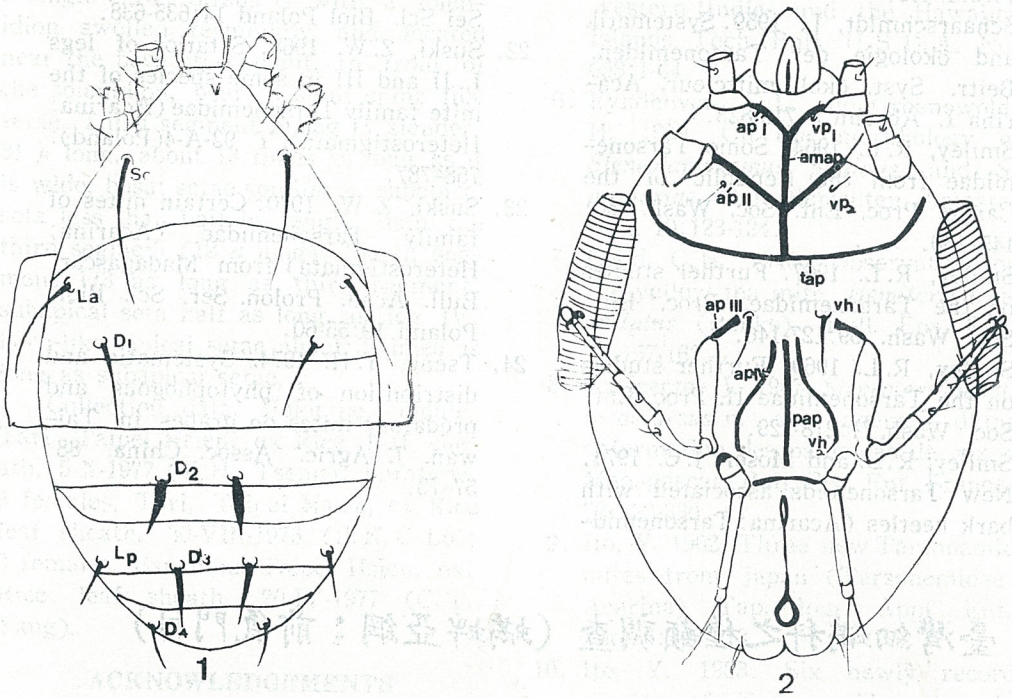
曾義雄[1] 羅幹成[2]

摘 要

細蜎科屬蜎蜱亞綱之前氣門目，本科之種類體形均甚細微。全世界共有135種，分隸於22屬。臺灣共發現13種，其中6種爲新種：*Steneotarsonemus chiaoi*, *S. pulchellus*, *Tarsonemus wani*, *Neosteneotarsonemus mirabilis*, *Cheylotarsonemus minutus*及*Xenotarsonemus rivalis*。4種爲臺灣之新記錄：*Tarsonemus gramineus*, *T. smithi*, *Fungitarsonemus boriquensis* 及 *Steneotarsonemus furcatus*。在本文中亦成立之新屬，命名爲*Neosteneotarsonemus* 及 *Cheylotarsonemus*。

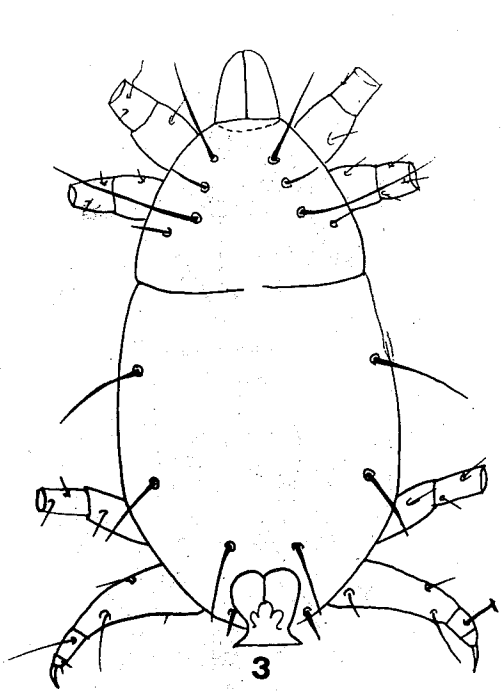
1.經濟部商品檢驗局臺南分局。
2.臺灣省農業試驗所應用動物系。

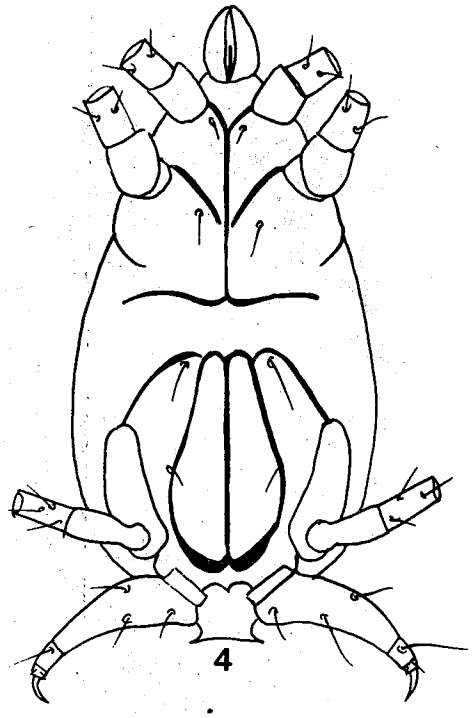
EXPLANATION OF FIGURES

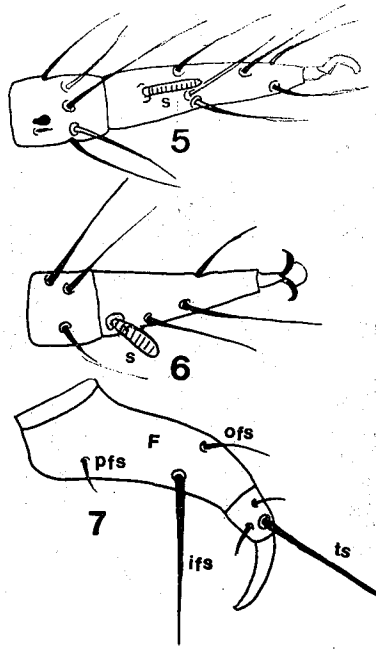


Figs 1-2. *Tarsonemus smithi* Ewing (female)

1. Dorsal.
   V: Vertical seta; Sc. Scapular setae; D1-4: Dorsocentral setae; La:Anterolateral setae; Lp:Posterolateral setae.
2. Ventral.
   apl-IV: apodemes; tap: transverse apodeme; amap:anteromedian apodeme; pap: posteromedian apodeme; Vpl-2:ventral propodosomal setae; Vh1-2: Ventral hysterosomal setae

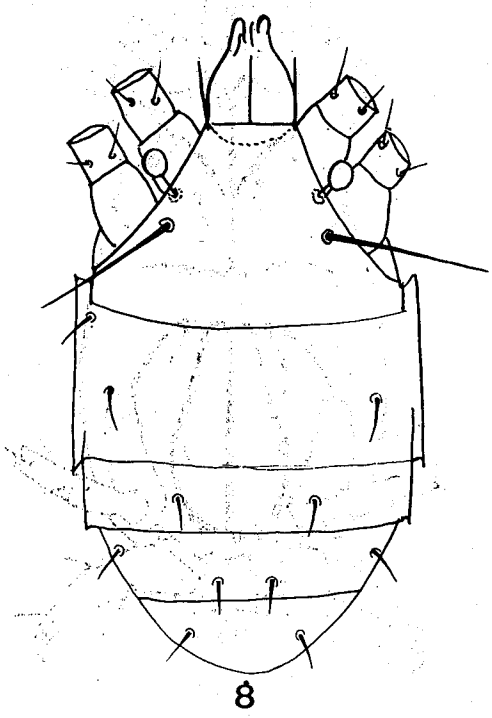


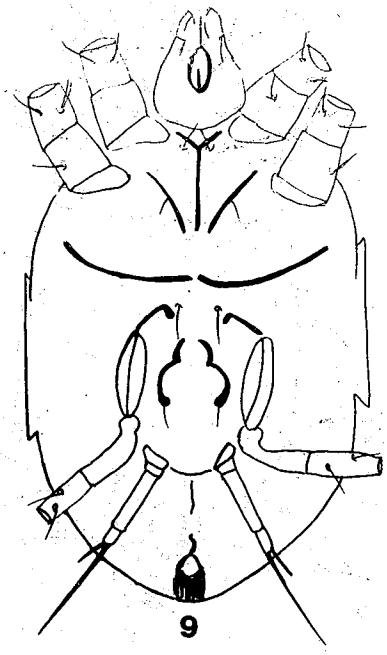


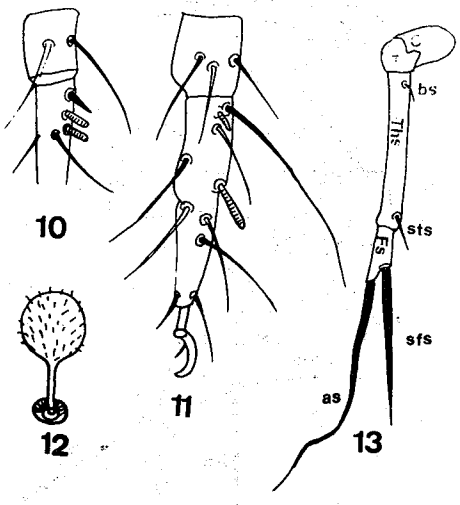


Figs 3-7 *Tarsonemus gramineus* Cromroy (male)

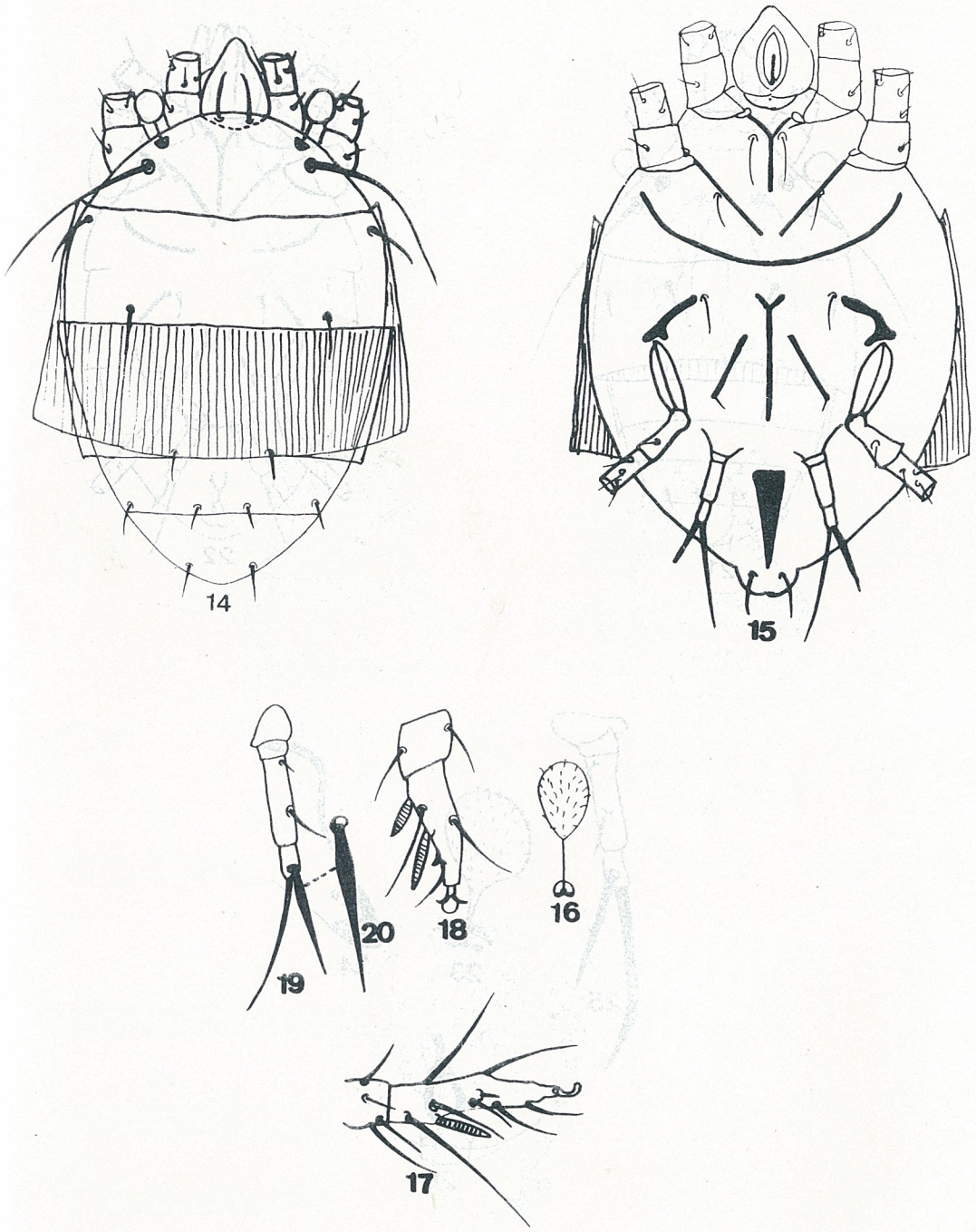
3. Dorsal.
   P1-4 Propodosomal setae.
4. Ventral.
5. Leg I. 6. Leg II. 7. Leg IV
   S:Solenidion; F: Femur; Pfs: Proximal femoral setae; ifs: inner distal femoral setae; ofs: outer distal femoral setae; ts: tactile setae.



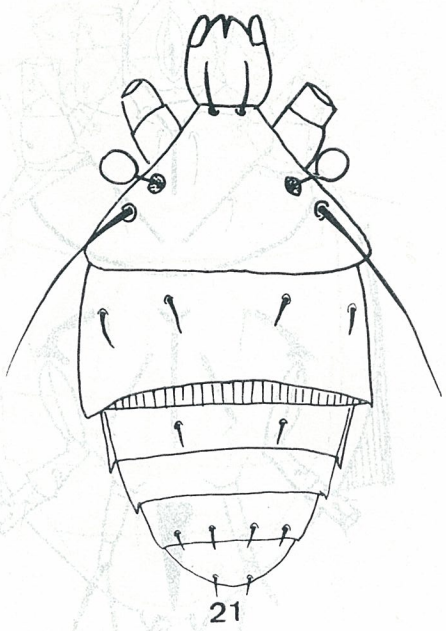


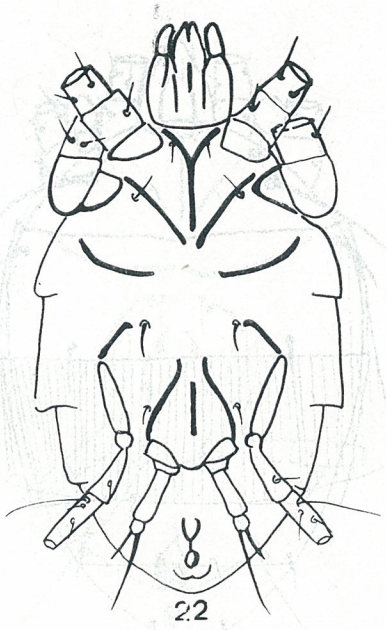


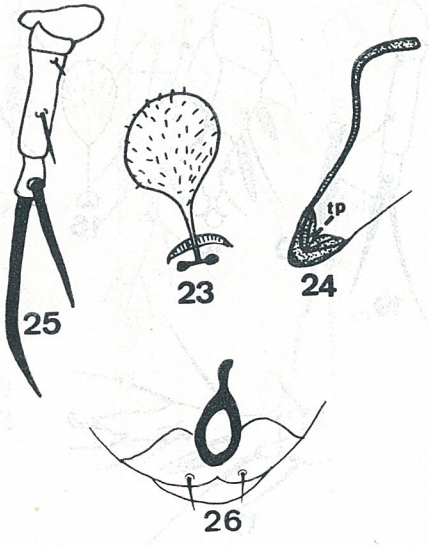
Figs 8-13 *Tarsonemus floricolus* Canestrini and Fanzago (female)
8. Dorsal. 9. Ventral. 10. Base of tarsus II; 11. Leg I
12. Female Pseudostigmatic organ. 13. Leg IV
C. Coxa; T: Trochanter; Ths: Third segment Fs: Fourth segment; bs:basal setae; sts: subapical seta of third segment; sfs: subapical setae of fourth segment; as: apical setae.



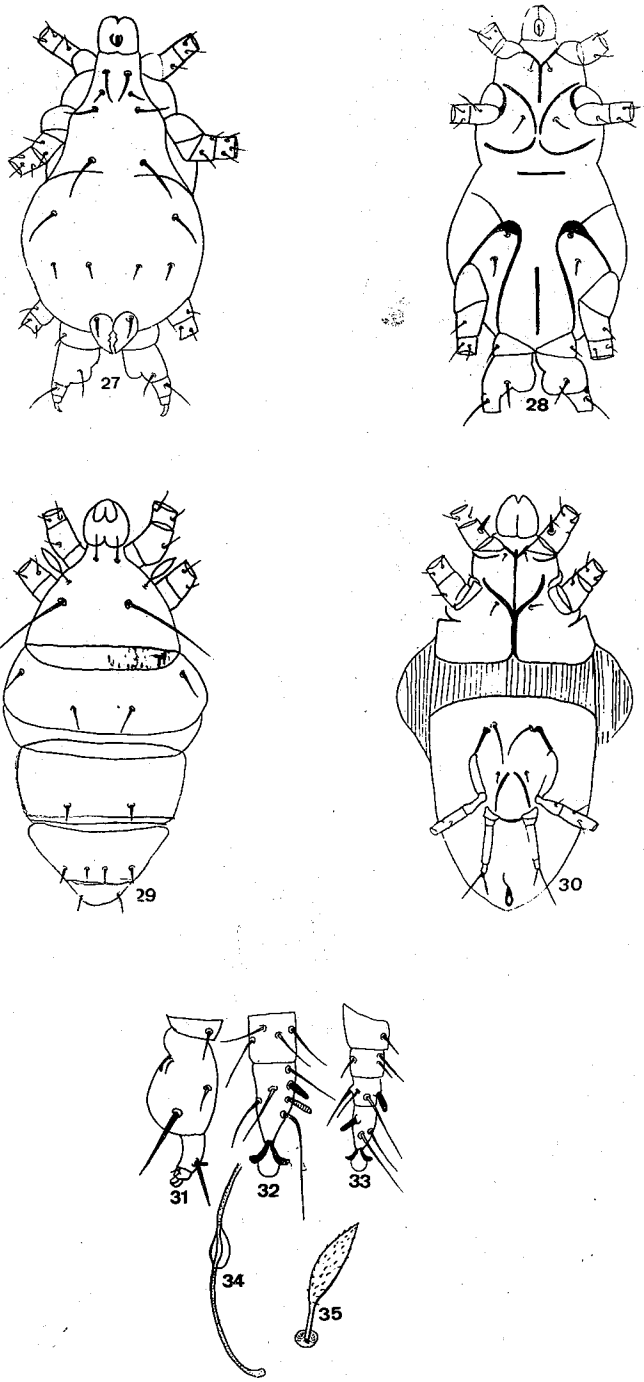
Figs. 14-20 *Tarsonemus wani* new species (female)
14. Dorsal. 15. Ventral. 16. Pseudostigmatic organ,
17. Leg I, 18. Leg II; 19. Leg IV
20. Subapical setae of fourth segment.



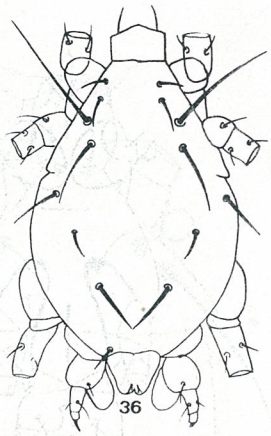


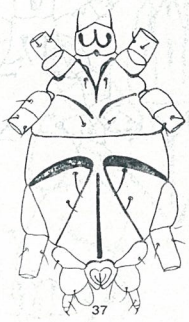


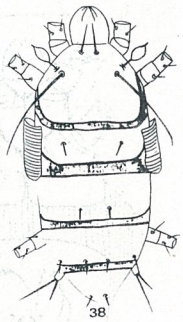
Figs. 21-26 *Xenotarsonemus rivalis* new species (females)
21. Dorsal. 22. Ventral. 23. Pseudostigmatic organ.
24. Tracheal system. 25. Leg IV. 26. Anal region, tp:tracheal plate.

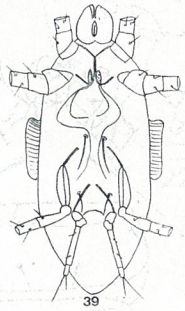


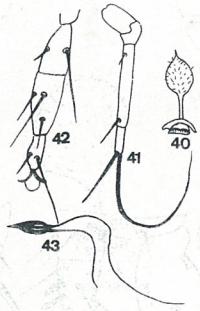
Figs. 27-35 *Steneotarsonemus chiaoi* new species
27. Dorsal (male), 28. Ventral (male), 29. Dorsal (female),
30. Ventral (female), 31. Leg IV (male) 32. Leg II (male).
33. Leg III (male), 34. Tracheal system, 35. Pseudostigmatic organ.

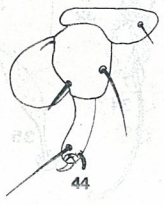






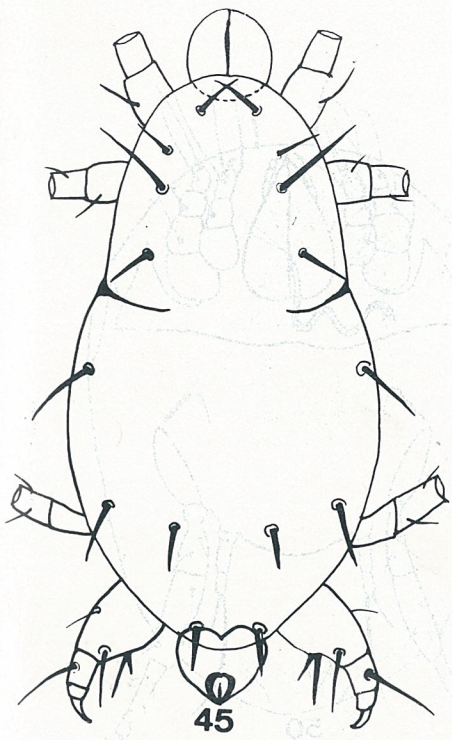


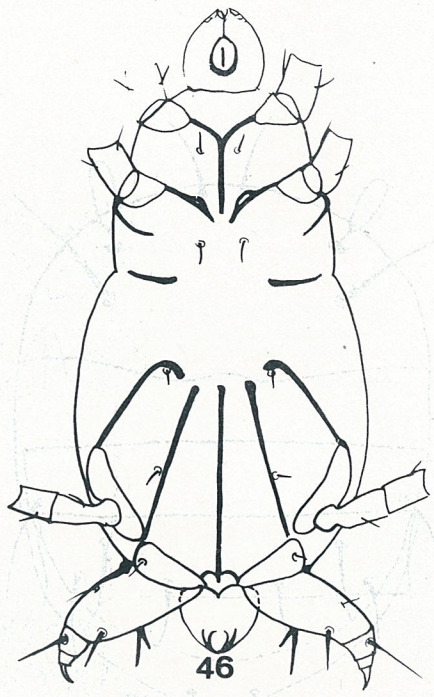


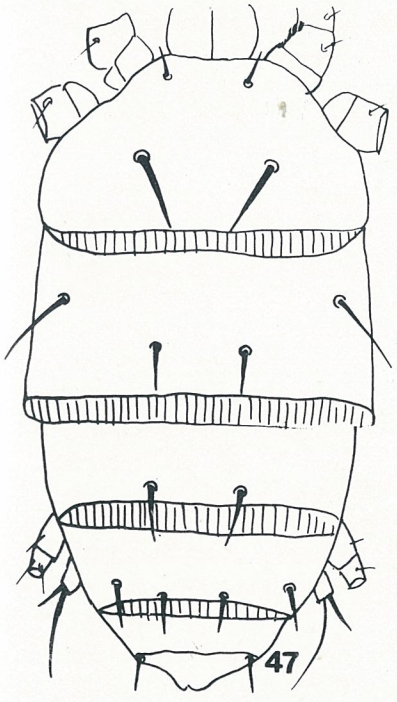


Figs. 36-44. *Steneotarsonemus pulchellus* new species

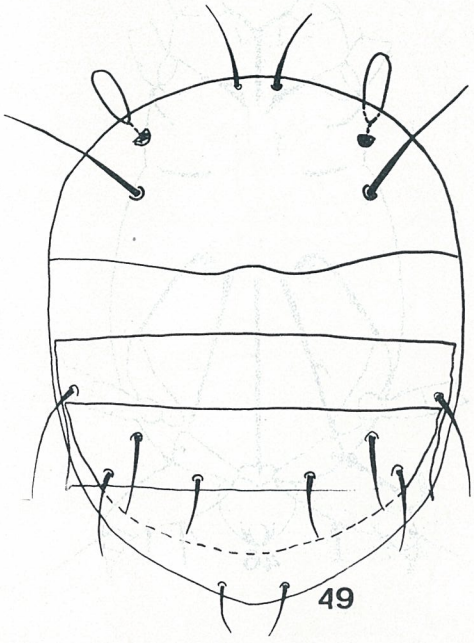
36. Dorsal (male),	37. Ventral (male),	38. Dorsal (female),
39. Ventral (female),	40. Pseudostigmatic organ,	41. Leg IV (female),
42. Leg III (female),	43. Tracheal system.	44. Leg IV (male).

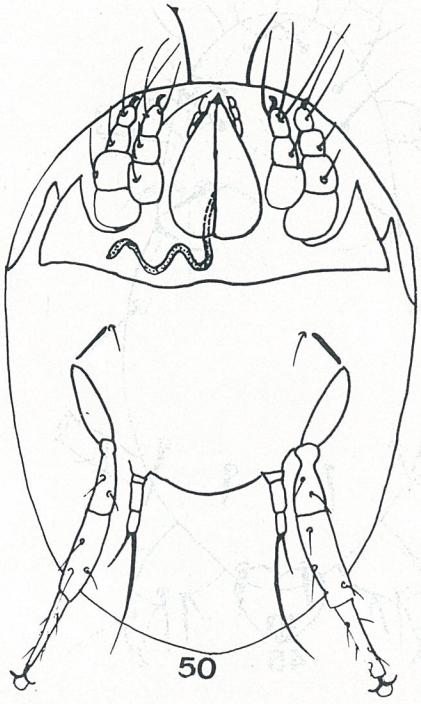


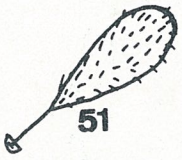


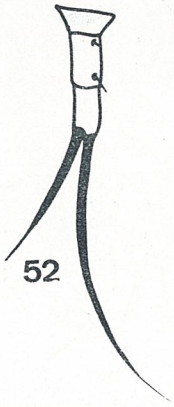


Figs. 45-48 *Steneotarsonemus furcatus* Deleon
45. Dorsal (male). 46. Ventral (male),
47. Dorsal (female), 48. Ventral (female)

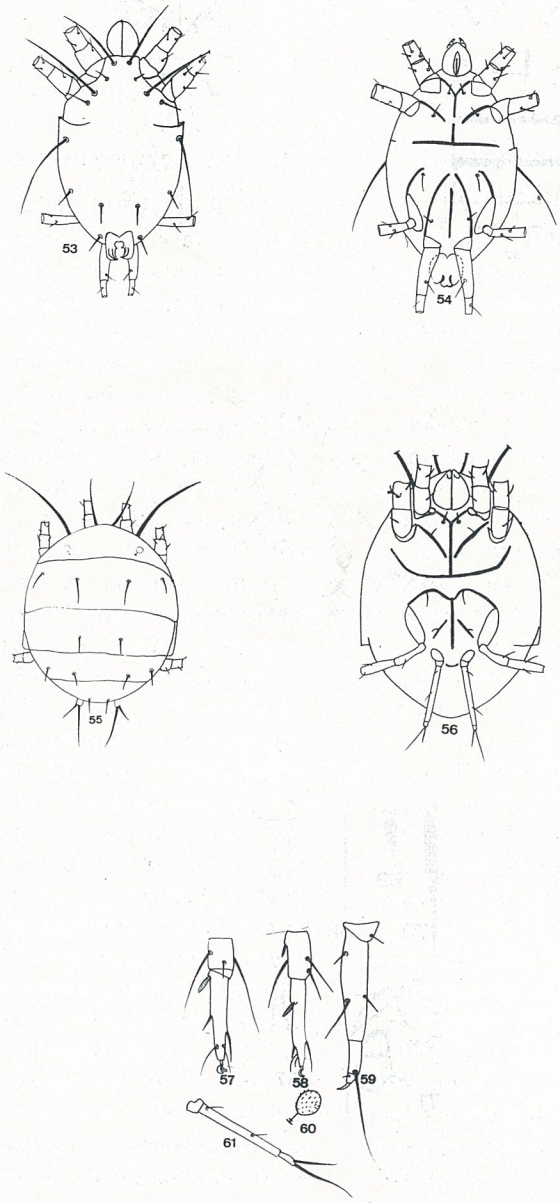






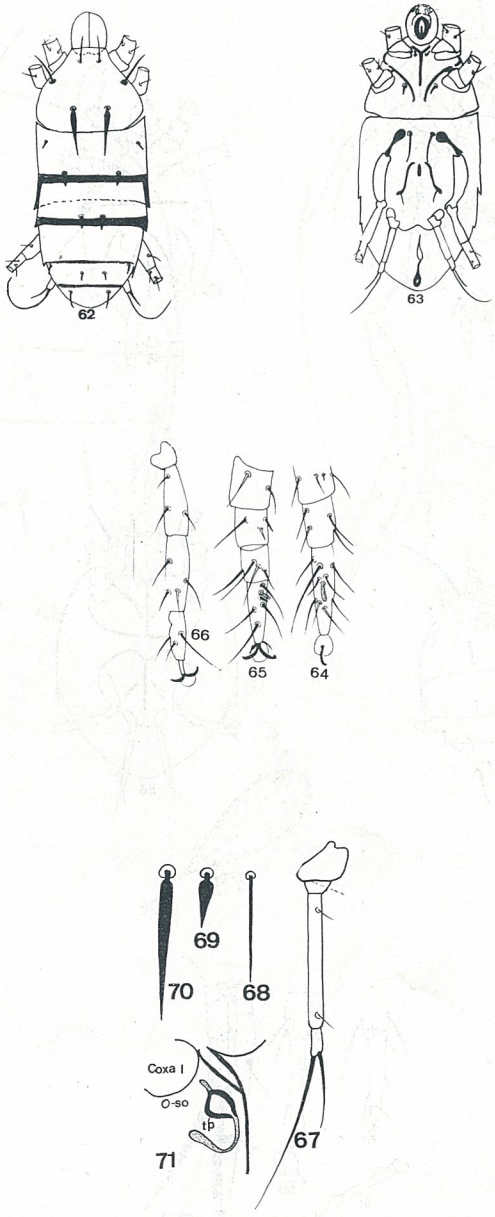


Figs. 49-52 *Cheylotarsonemus minutus* new species (female)
49. Dorsal. 50. Ventral. 51. Pseudostigmatic organ, 52. Leg IV.



Figs. 53-61 *Fungitarsonemus borinquensis* Cromroy

53. Dorsal (male),
54. Ventral (male),
55. Dorsal (female),
56. Ventral (female),
57. Leg II (male),
58. Leg I (male);
59. Leg IV (male),
60. Pseudostigmatic organ,
61. Leg IV (female).



Figs. 62-71 *Neosteneotarsonemus mirabilis* new species (female)

62. Dorsal. 63. Ventral. 64. Leg I. 65. Leg II,
66. Leg III, 67. Leg IV, 68. Pseudostigmatic organ,
69. Dorsocentral setae, 70. Scapular setae,
71. Coxa I region. So: stigmatid opening.